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Research Report 1501

SINCGARS Operator Performance Decay

Richard L. Palmer and Louis W. Buckalew

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November 1988

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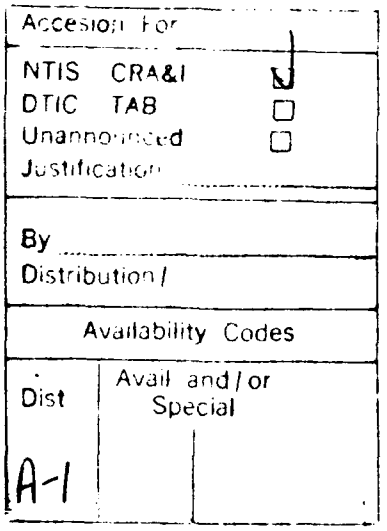

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The Single-Channel Ground/Airborne Radio System (SINCGARS) is scheduled to replace the Army's VRC-12 and PRC-77 radios. However, SINCGARS is more complex to operate and requires more training. This study examined the decay of operational skills and knowledge in two groups of recently trained operators who went without exposure to SINCGARS for several weeks. Performance levels were measured with the SINCGARS Learning-Retention Test (SLRT), a simulated hands-on performance test emphasizing skills and operational knowledge retention. The results provided tentative indications that operators may lose about 10 percent of their prior performance levels within the first few weeks. This figure is expected to vary considerably, depending on the type of soldier, the length of the nonexposure period, and other conditions. It was also found that performance level was correlated with soldiers' Armed Services Vocational Aptitude Battery (ASVAB) General Technical (GT) scores. Correlations between GT and SLRT scores obtained at two different times were .43 and .50,
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respectively. However, no relation was observed between performance decay and GT. Further evaluation of operator performance decay needs to be done to determine the effect of longer periods of nonexposure (e.g., 60 and 90 days).

Research Report 1501

SINCGARS Operator Performance Decay

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FOREWORD

As part of its overall mission, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) conducts Manpower and Personnel Integration (MANPRINT) related research in the areas of manpower, personnel, and training. The research reported here concerns the Single-Channel Ground/Airborne Radio System (SINCGARS), developed by ITT Corporation and currently undergoing user testing within the Army's materiel acquisition process. The report addresses the SINCGARS operator's problem of learning and retaining the operational skills and knowledge required to use this complex radio system successfully. It also provides groundwork for planned evaluations of SINCGARS training.

The project, part of the Fort Hood Field Unit's research on "Manpower, Personnel, and Training Considerations in User Testing," was conducted pursuant to "Letter of Agreement Between the U.S. Army Research Institute for the Behavioral and Social Sciences and the U.S. Army Operational Test and Evaluation Agency," June 1983. The report was provided in December 1987 to the following U.S. Army organizations: the Operational Test and Evaluation Agency (SINCGARS Test Evaluator), the Training and Doctrine Command (SINCGARS System Manager), the Communications and Electronics Command (SINCGARS Project Manager), and the Test and Experimentation Command (SINCGARS Test Officer). It provides information relevant to determining the need for further SINCGARS training evaluations as well as to the planning of remedial and maintenance-of-skills training programs.

EDGAR M. JOHNSON
Technical Director

SINCGARS OPERATOR PERFORMANCE DECAY

EXECUTIVE SUMMARY

Requirement:

The Single-Channel Ground/Airborne Radio System (SINCGARS) is intended to replace the current VRC 12 and PRC 77 series radios. While SINCGARS offers far greater capability than its predecessors, it does so at the cost of greater operational complexity. Hence, SINCGARS places a greater cognitive burden on operators and trainees than current radios and creates a need for enhanced training programs. The exploratory field study reported here was performed by the U.S. Army Research Institute (ARI) to determine (a) the effect of the absence of practice on the posttraining performance level of operators over time and (b) the relation between the Armed Services Vocational Aptitude Battery (ASVAB) General Technical (GT) scores of operators and posttraining performance. The research was conducted in conjunction with nonscheduled user testing by the U.S. Operational Test and Evaluation Agency (OTEA) at Fort Riley and by the SINCGARS Project Manager at Fort Gordon.

Procedure:

Operator performance was measured with the SINCGARS Learning-Retention Test (SLRT), a simulated hands-on SINCGARS performance test constructed by ARI. Two sets of data were obtained: (a) from 12 combat arms soldiers in the 1st Infantry Division, Fort Riley, 1986 (Group CA); and (b) from 46 communications-electronics soldiers in the 67th Signal Battalion, Fort Gordon, 1986-87 (Group CE). Both groups were administered the SLRT after SINCGARS exposure (training and field exercise) and again after an interval with no practice or other exposure to the radio.

The schedule of events for Group CA was 30 hours of instruction, 2 days of nonexposure to SINCGARS, 4.5 days of field experience, 2 days of nonexposure, first SLRT, 5.5 weeks of nonexposure, second SLRT. The schedule for Group CE was 25 hours of instruction, 10 days of nonexposure to SINCGARS, 11 days of field experience, 8 to 18 days of nonexposure, first SLRT, 10 weeks of nonexposure, second SLRT.

In addition, ASVAB GT scores were obtained for the groups from unit personnel files. These scores were evaluated for possible correlation with performance on the SLRT.

Findings:

Both groups exhibited a statistically significant decay in performance level from first to second SLRT administration. The average individual decay for Group CA was 10 percent; for Group CE, however, it was only 3 percent.

Examination of the schedule of events for the latter group suggests, however, that some decay probably occurred before the first SLRT administration during the 8- to 18-day nonexposure interval between the field exercise and the first SLRT. Therefore, the Group CA figure (10 percent) was taken to be more indicative of what might be expected during the first few weeks of nonexposure. However, the validity and practical significance of both figures (10 percent and 3 percent) remain to be determined, as does the amount of decay over longer periods of time (e.g., 60 and 90 days).

The statistical correlation between the operators' GT scores and their performance scores on the SLRT was .43 for the first SLRT administration and .50 for the second for both groups combined. These coefficients indicate that, on the average, about 22 percent of the variance in SLRT scores can be predicted by GT scores. This would appear to bear some practical significance, but, again, the validity of the result needs to be further established.

Utilization of Findings:

These findings will assist in the development of SINCGARS training programs and evaluations by the Training and Doctrine Command, the Operational Test and Evaluation Agency, the Communications and Electronics Command, and other organizations involved in the acquisition of the SINCGARS system. The results of this research, though preliminary, suggest a need to consider that the properly trained SINCGARS operator, through no fault of his or her own, may become unable to operate the radio in a satisfactory manner if a substantial period of nonexposure to the radio occurs. Some attention may need to be given to the possible development of programs of periodic remedial, or refresher, training.

SINCGARS OPERATOR PERFORMANCE DECAY

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SINCGARS Operator Performance Decay

Introduction

The Single-Channel Ground/Airborne Radio System (SINCGARS) under development by ITT Corporation, Aerospace/Optical Division, is contractually slated to become the Army's primary tactical net radio system. The new system will replace the antiquated PRC-77 and VRC-12 series radios. It is estimated that approximately 300,000 of the new radios will be fielded--16,000 of the so-called production model and the remaining an upgraded model that incorporates an integrated communications security (ICOM) model.

The ITT SINCGARS, because of its advanced electronic and operational complexity, gives rise to new challenges for the operator and operator training programs. Basic principles of learning indicate that, as the task complexity of a system increases, there is not only a concomitant increase in learning time but also in the potential for both post-learning interference and decay, especially in the absence of periodic practice. Hence, the impact of these variables on SINCGARS operator performance has become of concern to the Army.

Responsibility for the operational testing of SINCGARS is assigned to the Army's Operational Test and Evaluation Agency (OTEA), and OTEA has conducted all operational tests of the system to date. However, future operational testing will be conducted by the Army Test and Experimentation Command (TEXCOM), with OTEA acting as Independent Evaluator. The Army Research Institute (ARI) has participated in the SINCGARS operational testing program since 1982 under the primary sponsorship of OTEA, but also in cooperation with the Training and Doctrine Command (TRADOC), the Communication and Electronics Command (CECOM), and the TRADOC Combined Arms Test Activity (TCATA, precursor to TEXCOM).

The purpose of this report is to summarize ARI's Manpower and Personnel Integration (MANPRINT) findings concerning the SINCGARS operator's retention of learned operating skills and knowledge over time. The research focused on determining (a) how much learning decay occurs over time in the absence of practice and (b) if there is a relation between operators' General Technical (GT) scores[1] on the Armed Services Vocational Aptitude Battery (ASVAB) and their post-training levels of skill and knowledge (and, by inference, training assimilation).

ARI first obtained data pertaining to SINCGARS operator skills and knowledge retention in 1983-84 in association with OTEA's "Maturity Operational Test" (MOT)[2] at Fort Riley, Kansas. Later, on two occasions, ARI collected additional data. The first occasion was in conjunction with a special "Non-Developmental Item" (NDI) Operational Assessment conducted by OTEA at Fort Riley in the fall of 1986. The NDI assessment was an Army response to

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[1]The GT is a composite score based on certain arithmetic reasoning and verbal subscales of the ASVAB.

[2]Test Report of the Operational Assessment of the Single Channel Ground and Airborne Radio Subsystem-Very High Frequency Portion (SINCGARS-V). U.S. Army Operational Test and Evaluation Agency, Falls Church, VA 22041-5115, 1984.

unanticipated delays in the acquisition of the ITT SINCGARS. The intent of the assessment was to determine whether any currently available "off-the-shelf" (non-developmental) radios would suffice as interim replacements for the PRC-77 and VRC-12 radios. Ten vendors (including ITT) submitted radios for evaluation. The ITT SINCGARS was included for comparison purposes. Also, after the NDI assessment, ARI obtained retention data in late 1986 and early 1987 from SINCGARS-trained operators in the 67th Signal Battalion at Fort Gordon, Georgia. These soldiers had participated in a special SINCGARS evaluation sponsored and conducted by the SINCGARS Project Manager (PM). The present report deals primarily with the latter two groups, i.e., Fort Riley (1986) and Fort Gordon (1986-87), which for convenience shall be referred to in the remainder of this report as the Combat-Arms Group (Group CA) and the Communications-Electronics Group (Group CE), respectively.

Method

Participants

The first column of Table 1 lists the Military Occupational Specialties (MOSs) of the cavalry and artillery soldiers from whom early retention data were gathered during 1983-84 in conjunction with the SINCGARS MOT. Of the 24 cavalry soldiers, 23 participated in a second administration of the SLRT and 10 in a third. Of the 29 artillery soldiers, 27 were present for a second administration and 6 for a third.

Group CA. During the NDI Operational Assessment at Fort Riley, 12 combat arms soldiers, including 1 officer, were trained as operators of the ITT SINCGARS radio. The third column of Table 1 shows the MOS distribution for these soldiers. The column heading gives their mean ASVAB GT score. The individual GT scores ranged from 95 to 128. Eleven of the 12 soldiers participated in both an initial and a subsequent administration of the SINCGARS Learning-Retention Test (see Instrument, below).

Group CE. The right-hand column of Table 1 lists the MOSs represented by the 46 SINCGARS-trained operators from the 67th Signal Battalion at Fort Gordon. The frequency distribution for the MOSs was not obtained. The column heading shows the mean of the GT scores, which ranged from 86 to 127, with the exception of one low score of 71. Of these 46 soldiers, 29 completed both the initial and subsequent administrations of the learning-retention test.

Composite GT. The composite mean GT for the two groups of SINCGARS operators was 106.9, with a standard deviation of 11.8. The composite distribution of GT scores is shown in Figure 1.

Instrument: SINCGARS Learning-Retention Test (SLRT)

The purpose of the SLRT[3], constructed by ARI during the 1983 SINCGARS MOT, was to provide an efficient measure of the SINCGARS operator's skill and knowledge levels. The instrument was updated during the 1986 NDI Operational

[3]ITT SINCGARS Learning Retention Test (SLRT), Army Research Institute Field Unit, Fort Hood, TX 76544, 1983.

Assessment to correspond to changes in the radio and training. It was also reviewed by ITT subject-matter experts to ensure the validity of its contents.

Table 1

MOS Distribution and Mean GT Scores of Operator Groups

Previous Study				Present Study			
1983-84 (MOT)				1986 (NDI)		1986-87 (PM Eval.)	
Cavalry[a]		Artillery[a]		Group CA (Mean GT[b] = 112.1)		Group CE (Mean GT[c] = 105.3)	
MOS	n	MOS	n	MOS	n	MOS	n[d]
05B	1	:		:		:	
05C	3	:		:		:	
:		:		11B	3	:	
:		:		12B	1	:	
:		13C	4	:		:	
:		13E	5	:		:	
:		13F	7	:		:	
:		13M	8	:		:	
:		15J	2	:		:	
16S	1	:		:		:	
19D	9	:		:		:	
19E	5	:		19E	3	:	
:		:		:		26Q	--
:		:		31C	3	:	
:		:		:		31K	--
:		:		:		31M	--
31V	1	31V	1	31V	1	:	
:		34V	1	:		:	
:		:		:		36C	--
36K	1	36K	1	:		:	
63N	1	:		:		:	
:		:		:		72E	--
76Y		:		:		:	
:		:		93P	1	:	
96B	1	:		:		:	
Total:	24		29		12[b]		46[c]

[a]GT scores not obtained.
[b]GT scores were available for only 11 personnel.
[c]GT scores were available for only 38 personnel.
[d]The frequency distribution for Group CE MOSs was not available.

The paradigm for assessing skills and knowledge loss over time required two administrations of the SLRT separated by a time interval. To minimize practice effects from taking the same test twice, a parallel form of the SLRT (Form B) was also constructed (for both the original and updated versions).

The two forms (A and B) of the SLRT are analogous paper-and-pencil tests, each with two sections. Part 1 is a skill-oriented, simulated performance test that emphasizes the ability to perform radio operating procedures. The more recent version consists of the following seven operational tasks on which the soldier can score a maximum of 256 total points:

- o Test receiver-transmitter (RT) memories.
- o Load and store transmission security (TRANSEC) variable.
- o Load and store hopset.
- o Load date and time of day.
- o Conduct an electronic counter counter measures (ECCM) remote fill (ERF) of a hopset for net update.
- o Receive and store hopset ERF from net control station (NCS) during net update.
- o Load a minus offset.

Part 2 of the SLRT is knowledge oriented and places emphasis on procedures and their outcomes. It consists of 12 multiple-choice questions on which there are 152 points possible. A simple combination of Parts 1 and 2 provides a maximum possible score of 408.

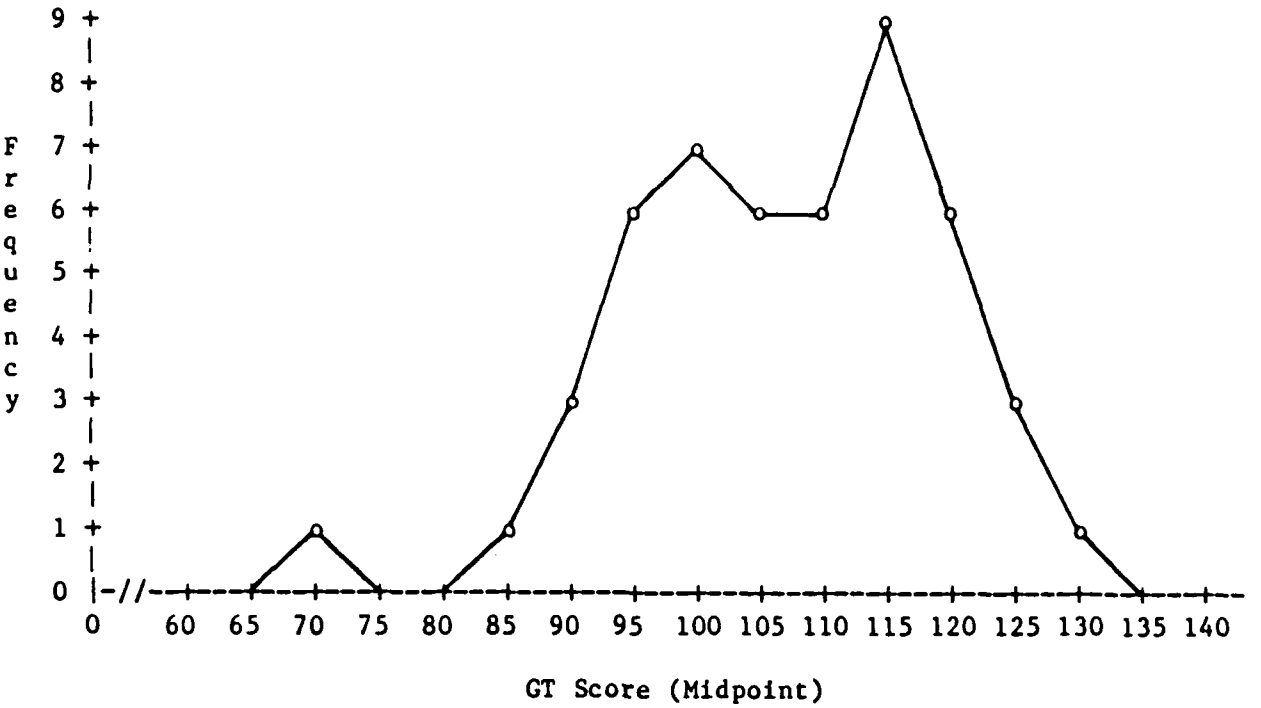

Figure 1. Composite distribution of radio operators' GT scores (n = 49); Groups CA and CE combined.

Equivalence of forms. A comparison of Form A (n = 23) and Form B (n = 23) on the first administration for Group CE yielded a mean of 270 for Form A and 273 for Form B. The corresponding standard deviations were 68.9 and 56.2, respectively. The t value resulting from a test of this difference was .19 ($p > .40$), which attested to the statistical equivalency of the two forms.

Procedure

Group CA received approximately 30 hours of classroom operator training and 4.5 days of subsequent field experience with the radio. Group CE received 25 hours of classroom training and 11 days of field experience. The operators were then administered the SLRT in group settings (the CA group at Fort Riley, the CE group at Fort Gordon). Approximately half the operators at each site received Form A; the other half received Form B. Twelve operators in Group CA and 46 operators in Group CE participated in the first administration. The second administration, which used the alternate form for each soldier, was conducted at the respective sites 5.5 weeks (Group CA; $n = 11$) and 10 weeks (Group CE; $n = 29$) after the first administration.

No time limit was placed on the test administration, and every effort was made to ensure the integrity of individual test performances. As each soldier finished (usually within 40 minutes), his or her test was reviewed by one of the two test administrators (ARI research psychologists) to ensure that all items had been answered. All tests were scored by the same individual.

Findings

Limitations

While the two groups of operators were similar in some respects, there were also important differences that might affect the interpretation of results. Major differences in sample composition and treatment procedures are listed in Table 2.

Decay Analysis: Group CA

Baseline. The SLRT scores from the first administration for all soldiers in the CA group ($n = 12$) ranged from 140 to 400, with a mean of 294 (72%) and a standard deviation of 68.5. For the 11 soldiers who were subsequently present for the second administration, the first administration mean and standard deviation were 300 (74%) and 68.9, respectively.

Decay. The SLRT scores on the second administration ranged from 180 to 353 ($n = 11$). The mean was 263 (64%); the standard deviation was 53.4. Thus, the second administration mean was lower. The difference between the means was tested for significance with a correlated t test. The probability of the resulting value, $t = -2.81$ ($df = 10$), was less than .02. The mean individual operator decay from the first to the second administration was 10%.

Decay Analysis: Group CE

Baseline. The mean SLRT score for all soldiers in the CE group ($n = 46$) on the first administration was 271 (66%). The range of scores was 124 to 388, and the standard deviation was 62.2. For those operators present at the second administration ($n = 29$), the first administration mean and standard deviation were 278 (68%) and 69.1, respectively.

Decay. The SLRT scores on the second administration ranged from 142 to 400. The mean was 267 (65%; n = 29), which, as in Group CA, was lower than the first administration mean. The standard deviation was 65.9. The difference between the means from the first and second administrations was statistically significant (correlated t = -2.06, df = 28, $p < .05$). The mean individual decay from first to second administration was 3%.

Table 2

Comparison of SINCGARS Operator Samples

Variable	Group CA	Group CE
Sample size[a]	12 & 11	46 & 29
Instruction	30 hours (by Sig. Sch.)	25 hours (by ITT)
Class size	12	15 to 16
Time between instruction & field experience	2 days	10 days
Length of field experience	4.5 days	11+ days[b]
Time between field experience & first SLRT	2 days	8 to 18 days
Time between SLRT tests	5.5 weeks	10 weeks
Operator MOSs	12B, 19E, 11B, 31C, 31V, 93P	26Q, 31K, 31M, 36C, 72E
Mean ASVAB GT	112.1	105.3

[a]First and second SLRT administrations.
[b]Five or 6 operators had small amounts of additional SINCGARS experience on special Signal Center tests.

Decay Analysis: Composite Sample

Several factors argued against combining the Fort Riley (Group CA) and Fort Gordon (Group CE) samples (see Table 2). The comparability of the samples was threatened by differences in MOS, the length of field experience with the radio, and the amount of time intervening between SLRT administrations. The soldiers in Group CA were predominantly in combat arms MOSs, whereas the soldiers in Group CE were in communications-electronics operations MOSs. Furthermore, Group CE soldiers had more field experience with the radio, longer time intervals between instruction and field experience and between field experience and the first SLRT administration, and nearly twice as long an interval between SLRT administrations as Group CA.

Groups comparison, baseline. Even with the differences cited, however, the disparity between Groups CA and CE on the baseline administration was fairly small. When the two means for the total samples (294 [n = 12] & 271 [n = 46], respectively) were compared with a t test for independent samples, the probability of the obtained t value, 1.10 (df = 56), was greater than .25. Figure 2 portrays the means graphically. (A similar comparison of the first-administration means for only those operators who participated in both administrations, 300 [n = 11] and 278 [n = 29], respectively, resulted in a t value of .87 [df = 38], which was also nonsignificant [$p > .20$]).

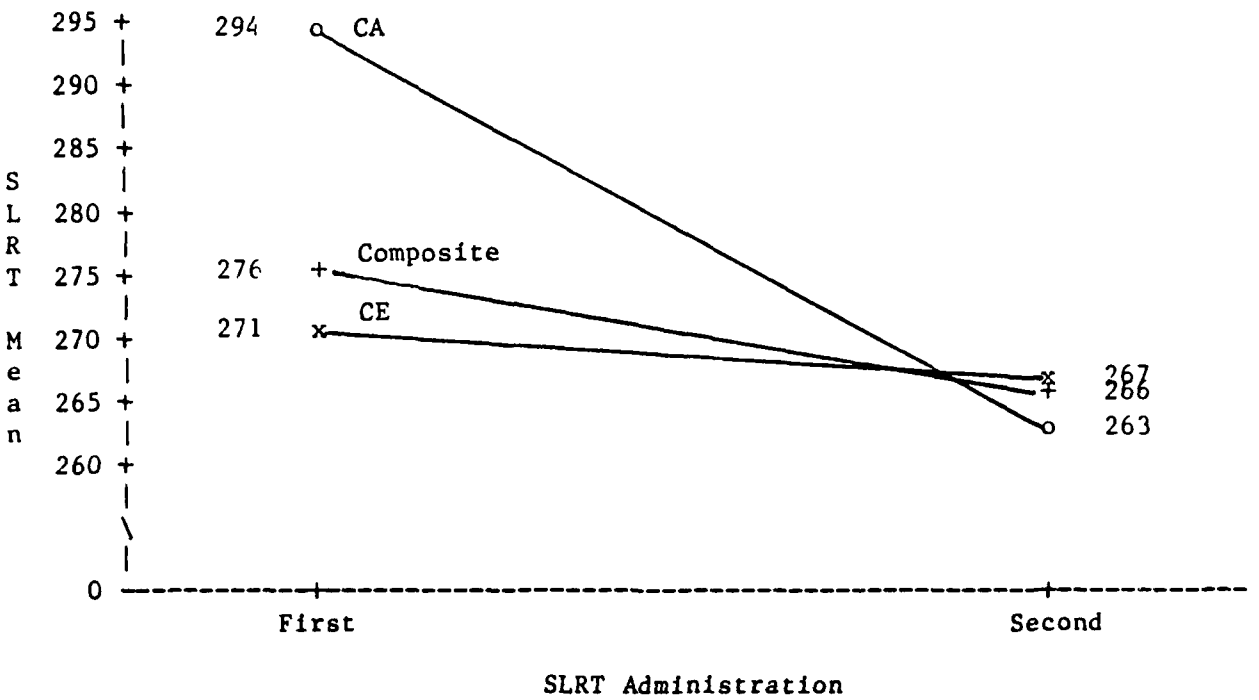

Figure 2. Comparison of Groups CA, CE, and Composite (CA and CE combined) on the SLRT. The points plotted are means based on all respondents for that administration.

Groups comparison, decay. The second-administration means, which were very similar to each other (263 and 267), are also portrayed in Figure 2. The difference was considered inconsequential and was not tested statistically.

Decay, composite sample. Because of the statistical similarity between Groups CA and CE and between Forms A and B of the SLRT, the scores of those operators from both groups who participated in both first and second administrations (n = 40) were combined. The composite means for the two administrations (284 and 266 respectively) were compared with a correlated t test. The resulting t value, -3.28 (df = 39), was significant ($p < .01$).

In addition, the first-administration scores from the two groups (n = 58; range 124 to 400) were combined into a general baseline. The mean and standard deviation were 276 (see Figure 2) and 63.6, respectively. However, because not all of these soldiers were available for the second administration

of the SLRT, the calculations were made for future reference only and were not used in the analysis. (The 18 soldiers not present for the second administration had a lower mean first-administration test score [258] than the 40 who were present [284]. Of the 18, 17 were in Group CE. A t test of the difference between the mean first-administration score [259] of the 17 and the mean first-administration score [278] of the 29 from Group CE who attended the second-administration was nonsignificant [t = .99, df = 44, p > .20].)

Figure 3 shows the percentages of operators whose scores fell within successive intervals of the SLRT range. The decay hypothesis implies higher scores during the first administration and lower scores during the second administration; therefore, more operators were expected in the higher intervals during the first administration and more in the lower intervals during the second administration. Figure 3 tends to confirm these expectations.

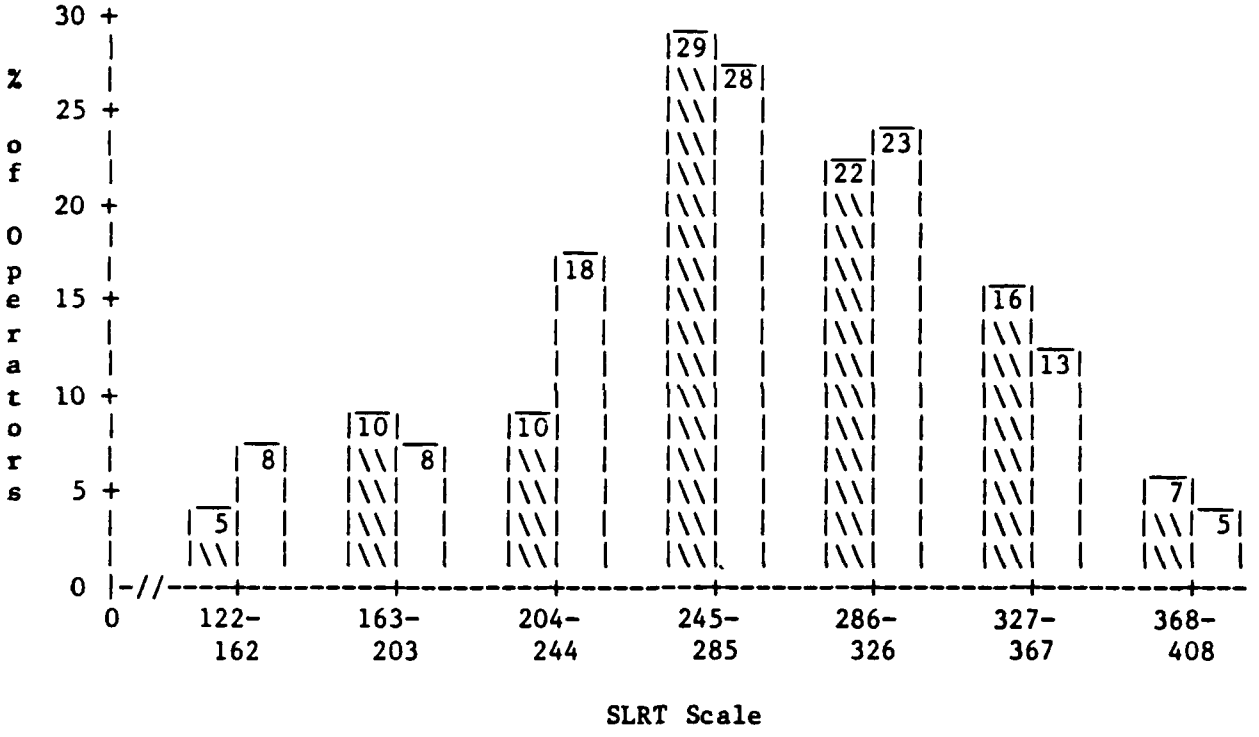

Figure 3. Comparison of 1st (cross-hatched bars) and 2nd (open bars) SLRT administrations. The interval between administrations ranged from 5.5 to 10 weeks.

ASVAB GT Scores, Composite Sample

The Pearson product-moment correlation between the operators' GT scores and first-administration SLRT scores was .43 (n = 48). For the second administration, the correlation was .50 (n = 39). Both coefficients were significant (p < .01), indicating that the higher the operator's GT score, the better his or her initial and subsequent performance levels.

The correlation between GT scores and individual decay percentages, however, was not significant: $r = .01$ ($n = 39$). Nor was the point-biserial correlation between GT scores and whether or not individual decay occurred: $r_{pb} = .06$ ($n = 26, 13$). The probability level for both coefficients was greater than .20.

Discussion

In 1983-1984, SINCGARS performance decay was assessed in connection with the Maturity Operational Test (MOT) at Fort Riley. With the original version of the SLRT and a classroom training and field-experience scenario similar to that of the present Fort Riley sample (Group CA), a group of 23 cavalry soldier-operators experienced a mean post-training, post-field-test decay of 2% following 3.5 weeks of non-exposure to SINCGARS. After seven months of non-exposure, the decay had increased to an average of 10% for the 10 operators still available for testing. In contrast, a group of 27 artillery soldiers showed an unexpected 5% decay immediately after 3.5 weeks of intensive field exposure following formal classroom training. Six of the operators who remained in the sample after seven months experienced an overall decay of 31%. Thus, the original data from the 1983-84 study were somewhat difficult to interpret: The cavalry soldiers exhibited a relatively small amount of decay, even after seven months; the artillery soldiers, however, experienced a relatively large decay, but 20% of it was already in evidence following an initial period of SINCGARS training and practice.

The results of the more recent research described here are also limited --by their descriptive nature (since SINCGARS was not compared to current radios) and by several uncontrolled variables inherent in the conditions under which the research had to be conducted: (a) Group CA had more classroom instruction (30 vs. 25 hours) and smaller classes than Group CE; (b) Group CA had less field-exercise experience with SINCGARS than Group CE (4.5 versus 11 days); (c) the classroom instruction for Group CA was provided by ITT-trained TRADOC instructors instead of by the ITT experts themselves, as for Group CE; (d) for Group CA, two days of non-exposure to SINCGARS intervened between the completion of their post-training field exercise and the first administration of the SLRT; for Group CE, there were varying intervals of 8 to 18 days (or more, in a few cases); (e) the interval (including a field exercise in which the operators used the radio extensively) between the completion of classroom training and the first SLRT was 9 days for Group CA and 29 to 39 (or more) days for Group CE.

Nevertheless, several interesting findings and hypotheses related to SINCGARS training and retention emerged from this study:

1. The level of SINCGARS operational skills and knowledge, as measured by the SLRT (both initial and subsequent administrations), was related to the operator's composite arithmetic and verbal performance on the ASVAB. The proportion of variance in SLRT performance accounted for by GT scores ranged from 18 to 25 percent.

2. The amount of post-training learning decay during the six weeks immediately following a period of intensive training and field exercise was 10%, which was statistically significant. Whether this decay translates into

practical significance in terms of operational proficiencies is, as yet, an unanswered question. It appears that SINCGARS performance decay is rapid at first, but this study does not indicate what the long-term (e.g., 30, 60, and 90 day) effects of non-exposure may be, which is important knowledge for unit and remedial training programs. Furthermore, no determination about what constitutes acceptable levels of initial and retained learning can be made from the present SLRT data. This issue will be addressed during the SINCGARS Follow-On Test and Evaluation, the next scheduled operational test of SINCGARS.

3. The varying non-exposure delays prior to the administration of the first SLRT could have allowed appreciable decay to go undetected. The relatively immediate SLRT for Group CA yielded a mean score of 294, compared to 271 for the more delayed testing for Group CE. Although the difference between these means was not statistically significant, had the Group CE delay been shorter, their mean might have been higher. In other words, the difference in initial SLRT scores might have been due to unmeasured decay.

4. The two operator groups performed quite similarly on the second SLRT administration (263 for Group CA; 267 for Group CE). The initially higher Group CA mean dropped 31 points, versus 4 points for Group CE. Considering the difference in time intervals between the first and second SLRT administrations for Groups CA and CE (5.5 and 10 weeks, respectively), the small difference remaining between the group means suggests that, as is typical of curves of complex learning, operator skills and knowledge tend to decline rapidly at first and then more slowly, tending to stabilize. In this case, the Group CE scores seem to have been relatively stable in the absence of practice for at least 10 weeks.

5. The smaller (though statistically significant) decay for the Group CE operators, even with a longer period of non-exposure to SINCGARS, may have been related to the soldiers' MOSs. The Group CE soldiers from the 67th Signal Battalion (Fort Gordon) had communications-electronics MOSs, whereas the Group CA operators from the 1st Infantry Division (Fort Riley) had predominantly combat arms MOSs. It is possible, then, that the Fort Gordon operators might have ascribed more "meaningfulness" to their SINCGARS training and, consequently, better integrated their learning. Thus, the data suggest that MOS may be related to training effectiveness and performance via the extent to which the operator perceives a vested interest in the training.

Conclusion

The additional complexity and expanded operational capability of the SINCGARS tactical net radio, relative to the current PRC-77 and VRC-12 radios, strongly suggest that SINCGARS will require more training, place greater demands on the learner in developing operational competence, and be more prone to operator learning decay when operators do not engage in periodic practice.

It is clear that operating the SINCGARS radio is a complex task that will require practice if operator proficiency levels are to be maintained at high levels. However, certain SINCGARS training, performance, and decay variables need further evaluation. They include the effects of longer intervals of

non-exposure to SINCGARS, the operator's MOS and other demographic characteristics, and quantifiable performance factors such as critical task completion times, message completion rates, problems encountered, and error rates. The SINCGARS Follow-On Test and Evaluation, scheduled to start in 1988, will provide an opportunity to study some of these issues.